Urothelial Carcinoma (UCC):
Bladder
Ureter & Renal Pelvis

(實習醫師教案)

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Bladder carcinoma incidence

- The second most common cancer of the genitourinary tract.
- The incidence is higher in whites than in African Americans.
- The average age at diagnosis is 65 years.
- 75% localized to the bladder
- 5% regional lymph nodes or distant sites.

Risk factors and pathogenesis

- Cigarette smoking: 65% of cases in men, 20–30% in women.
- Smokers two- to threefold increased risk of bladder cancer than nonsmokers, dose related.
- Alpha- and beta naphthylamine, which are secreted into the urine of smokers.

Risk factors and pathogenesis

- Occupational exposure: 15–35% of cases in men, 1–6% in women.
- Workers in the chemical, dye, rubber, petroleum, leather, and printing industries are at increased risk.
- Specific occupational carcinogens include benzidine, beta-naphthylamine, and 4-aminobiphenyl.
- cyclophosphamide (Cytoxan)
- Artificial sweeteners
- Trauma to the urothelium -infection, instrumentation, and calculi.

BLADDER CANCER STAGING (TNM)

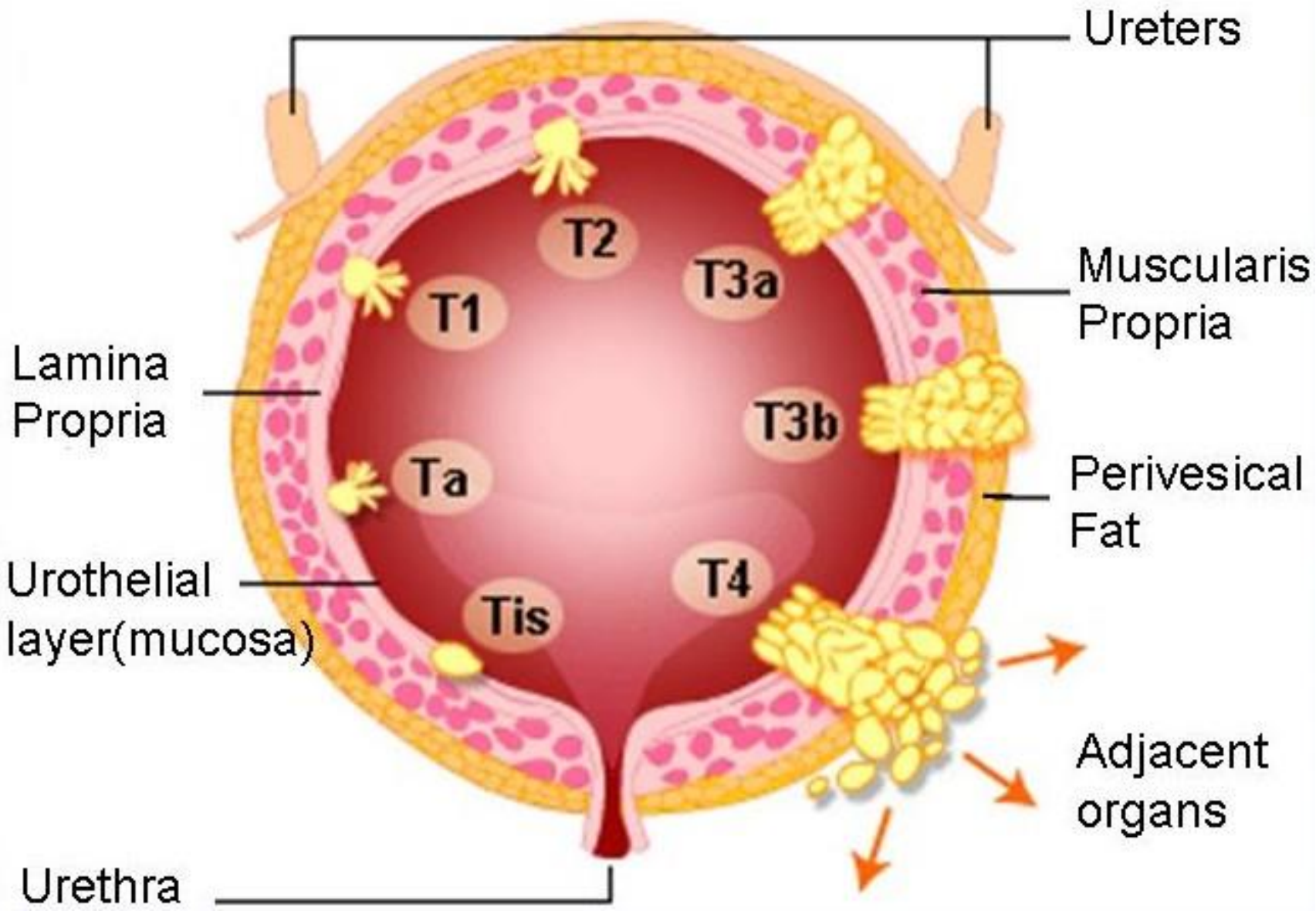


Table 1. **American Joint Committee on Cancer (AJCC) TNM Staging System for Bladder Cancer 8th ed., 2017)**

T	**Primary Tumor**
TX	Primary tumor cannot be assessed
T0	No evidence of primary tumor
Ta	Noninvasive papillary carcinoma
Tis	Urothelial carcinoma in situ: "flat tumor"
T1	Tumor invades lamina propria (subepithelial connective tissue)
T2	Tumor invades muscularis propria
pT2a	Tumor invades superficial muscularis propria (inner half)
pT2b	Tumor invades deep muscularis propria (outer half)
T3	Tumor invades perivesical tissue
pT3a	Microscopically
pT3b	Macroscopically (extravesical mass)
T4	Extravesical tumor directly invades any of the following: prostatic stroma, seminal vesicles, uterus, vagina, pelvic wall, abdominal wall
T4a	Extravesical tumor invades prostatic stroma, seminal vesicles, uterus, vagina
T4b	Extravesical tumor invades pelvic wall, abdominal wall

N	**Regional Lymph Nodes**
NX	Lymph nodes cannot be assessed
N0	No lymph node metastasis
N1	Single regional lymph node metastasis in the true pelvis (perivesical, obturator, internal and external iliac, or sacral lymph node)
N2	Multiple regional lymph node metastasis in the true pelvis

M	**Distant Metastasis**
M0	No distant metastasis
M1	Distant metastasis
M1a	Distant metastasis limited to lymph nodes beyond the common iliacs
M1b	Non-lymph-node distant metastases

Histologic Grade (G)

For urothelial histologies, a low- and high-grade designation is used to match the current World Health Organization/International Society of Urological Pathology (WHO/ISUP) recommended grading system:

LG	Low-grade
HG	High-grade

For squamous cell carcinoma and adenocarcinoma, the following grading schema is recommended:

GX	Grade cannot be assessed
G1	Well differentiated
G2	Moderately differentiated
G3	Poorly differentiated

Histopathology

- 98% all bladder cancers are epithelial malignancies.
- 95% Transitional cell carcinomas (TCCs).
- 5% are adenocarcinomas or squamous cell carcinomas.

Papilloma/PUNLMP

- The World Health Organization recognizes a papilloma as a papillary tumor with a fine fibrovascular stalk supporting an epithelial layer of transitional cells with normal thickness and cytology.
- These are also termed papillary urothelial neoplasms of low malignant potential or PUNLMP.
- PUNLMPs are a rare benign condition that do not require aggressive therapy.

Transitional Cell Carcinoma

- Approximately 90% of all bladder cancers are TCCs.
- Most commonly, papillary, exophytic lesions; less commonly, sessile or ulcerated.
- CIS: flat, anaplastic epithelium.

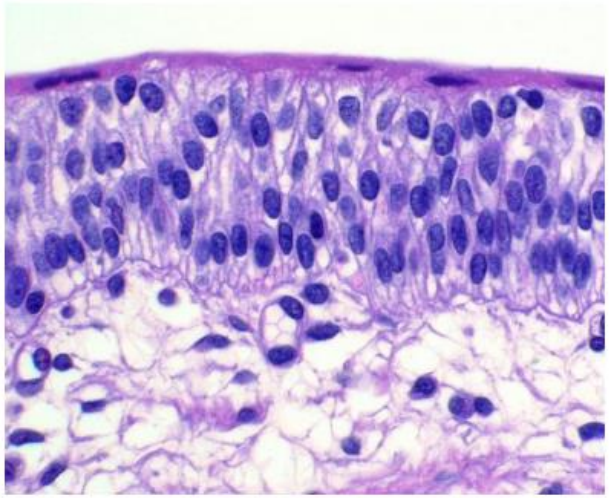
  abnormal cellular polarity

  large, irregular hyperchromatic nuclei with prominent nucleoli..

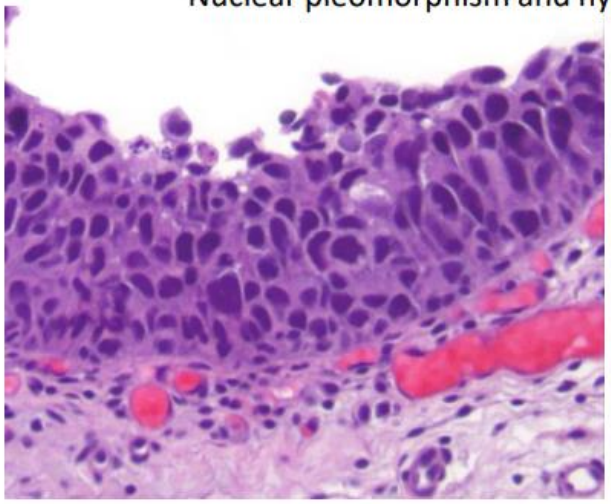
Flat Urothelial Carcinoma *(in situ)*

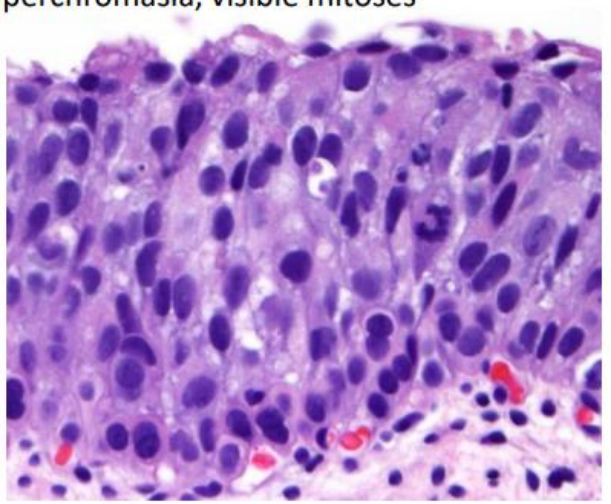
Histologic criteria and spectrum of morphology

Normal urothelium



Nuclear pleomorphism and hyperchromasia, visible mitoses





Non-transitional Cell Carcinomas

- **Adenocarcinoma—**Adenocarcinomas account for <2% of all bladder cancers.
- Primary adenocarcinomas often arise along the floor of the bladder,

  adenocarcinomas arising from the urachus occur

  at the dome.
- Muscle invasion is usually present. Five-year survival is usually <40%, despite aggressive surgical management.

Nontransitional Cell Carcinomas

- **Squamous cell**

chronic infection, vesical calculi, or chronic catheter use.

associated with bilharzial infection owing to *Schistosoma haematobium,* in Egypt, parts of Africa, and the Middle East.

- **Undifferentiated carcinomas—** neuroendocrine features and small cell carcinomas tend to be aggressive and present with metastases.
- **Mixed carcinoma—** combination of transitional, glandular, squamous, or undifferentiated patterns.

Clinical Findings

- Hematuria :85–90% gross or microscopic, intermittent rather than constant.
- Vesical irritability: frequency, urgency, and dysuria. (more common in diffuse CIS).
- Bone pain, or flank pain.

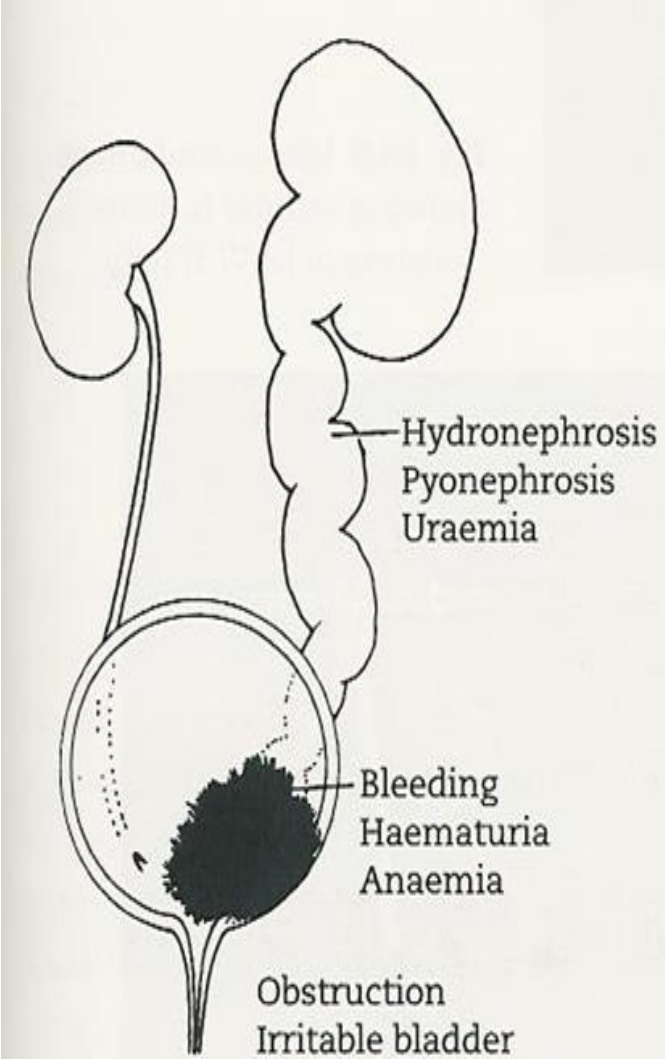
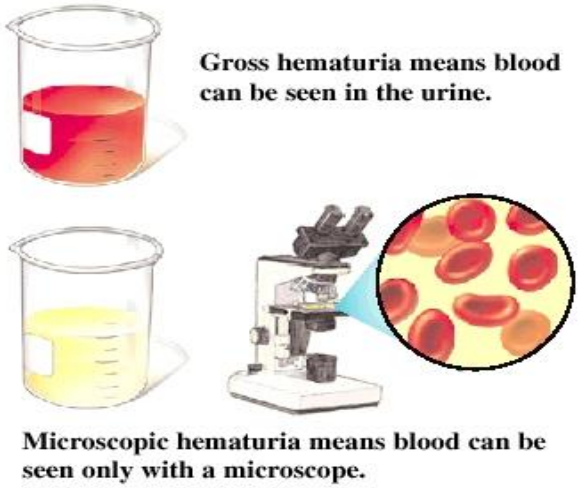


Fig. 16.6 Clinical features of bladder cancer.

Signs

- Large-volume or invasive tumors ; a palpable mass - bimanual examination under anesthesia.
- Hepatomegaly and supraclavicular lymphadenopathy are signs of metastatic disease.
- Lymphedema from occlusive pelvic lymphadenopathy
- Back pain or pathologic fracture from bony metastases.

Laboratory Findings



Routine

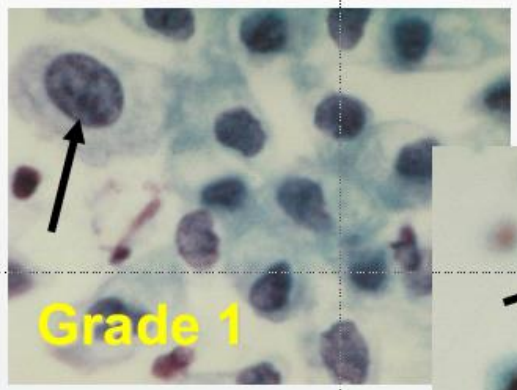
- hematuria, pyuria.
- Azotemia - ureteral occlusion owing to the primary bladder tumor or lymphadenopathy.
- Anemia - to chronic blood loss, or replacement of the bone marrow with metastatic disease.

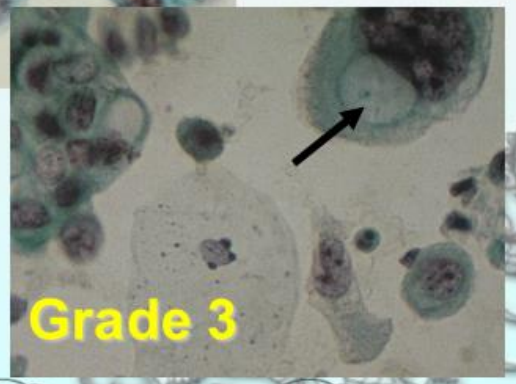
Laboratory Findings

Urinary cytology—

- Cytologic examination - detecting cancer and assessing response to treatment.
- Detection rates are high for tumors of high grade and stage as well as CIS but not as impressive for low-grade superficial tumors.

細胞學 (cytology)





Laboratory Findings-Other markers

Table 21–1. Exfoliated markers for the detection of bladder cancer.

Marker	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
Cytology	35–61	93–100	–	–
NMP22	49–68	86–88	29–65	60–100
BTA stat	57–83	68–85	20–56	70–95
BTA TRAK	54–91	28–84	62	73
Telomerase	62–80	60–99	84	89
UroVysion	30–72	63–95	45–92	31–88
ImmunoCyt	76–85	63–75	29–63	81–96
Cytokeratin 20	91	85	95	76

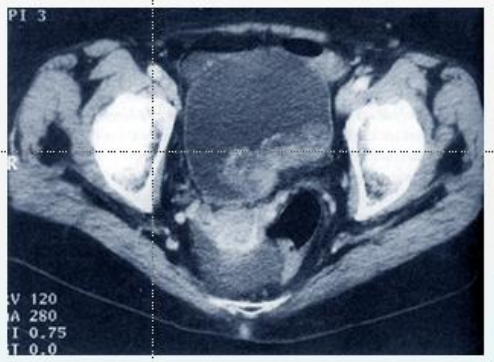
PPV, positive predictive value; NPV, negative predictive value.

Imaging

- Intravenous urography.
- Computed tomography (CT) urography, entire abdominal cavity, renal parenchyma, and ureters.
- Bladder tumors may be recognized as pedunculated, radiolucent filling defects projecting into the lumen.
- Non-papillary, infiltrating tumors may result in fixation or flattening of the bladder wall.
- Hydronephrosis from ureteral obstruction.

Image study


Tumour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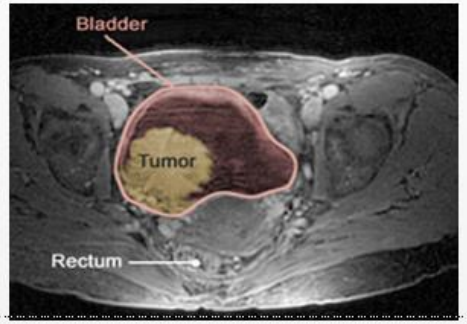
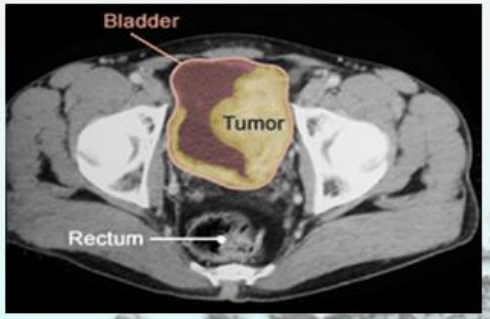
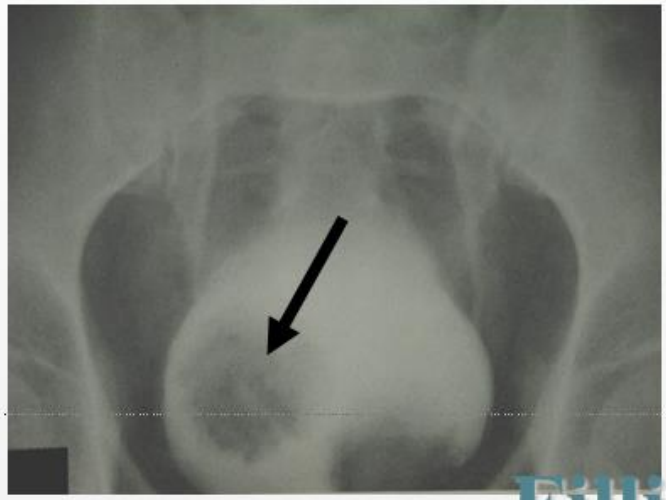
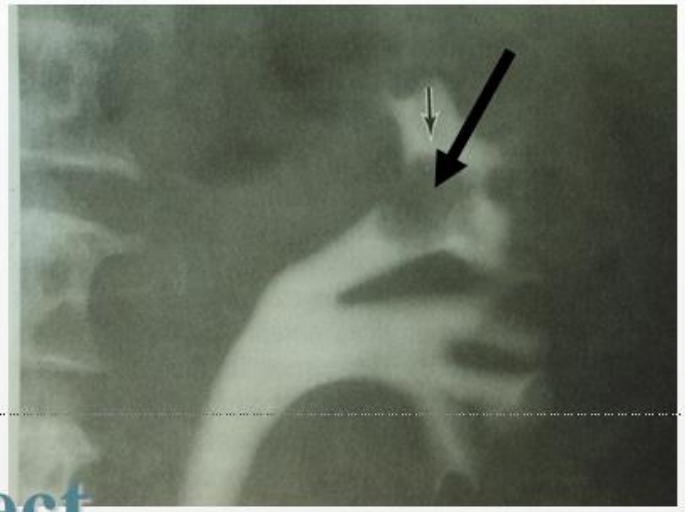

Bladder
Tumor
Rectum


Sonogram
Transducer

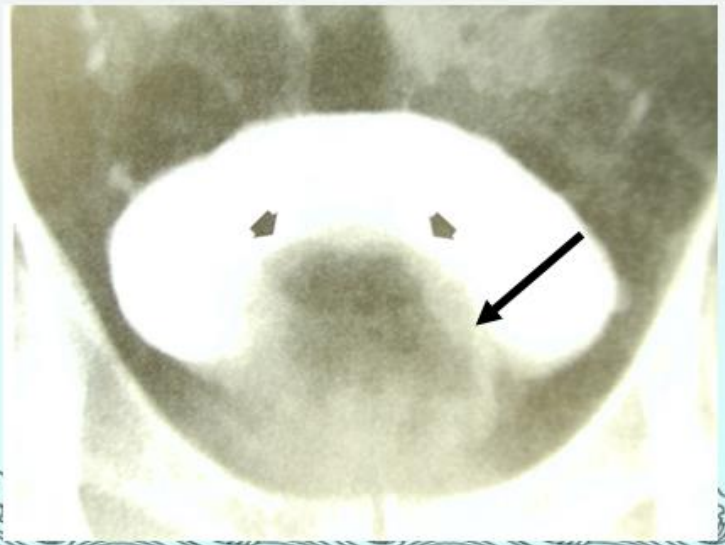

Bladder
Tumor
Rectum

IVU

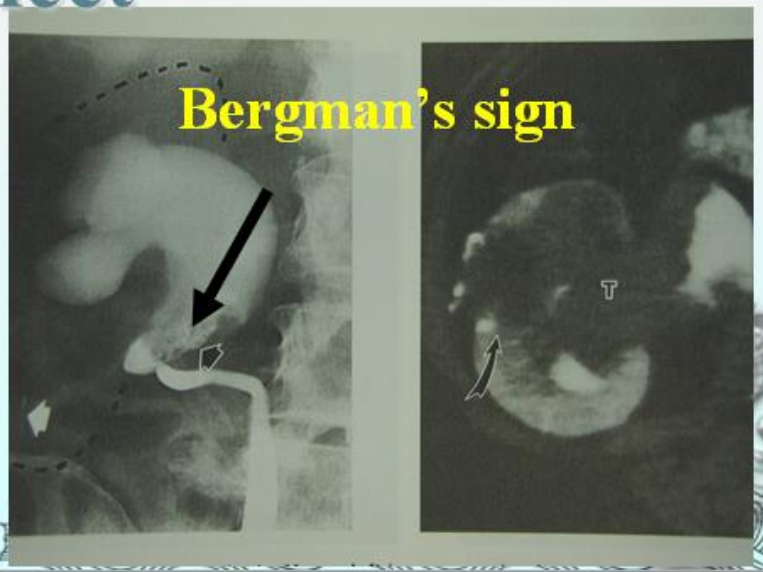




Filling defect



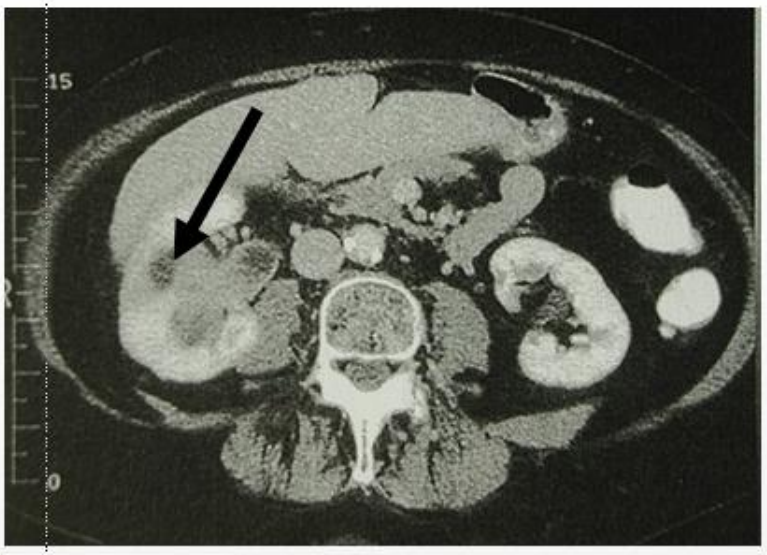
Bergman's sign

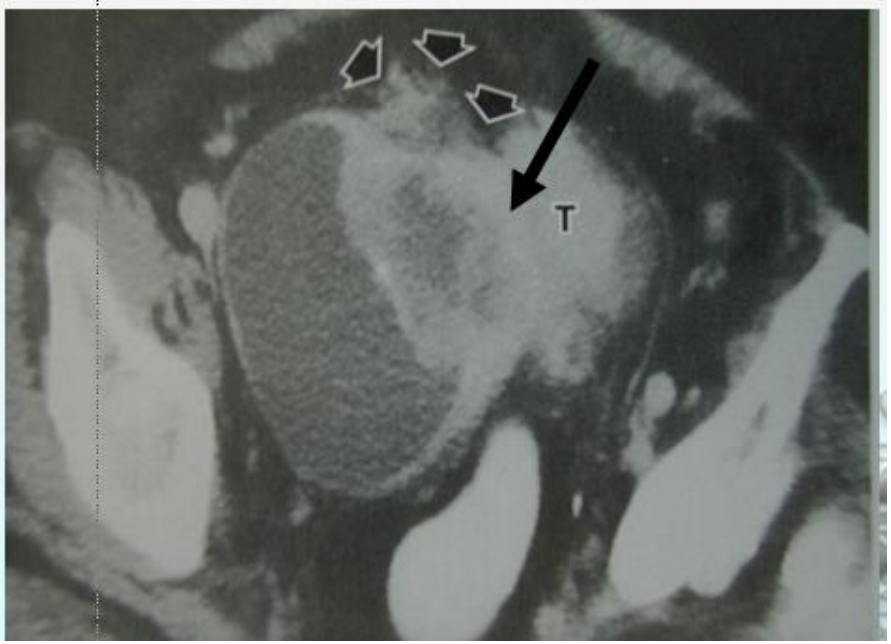


Imaging

- Both CT and magnetic resonance imaging (MRI) have been used to characterize the extent of bladder wall invasion and detect enlarged pelvic lymph nodes, with overall staging accuracy ranging from 40% to 85% for CT and from 50% to 90% for MRI.
- Chest x-ray and radionuclide bone scan.

CT





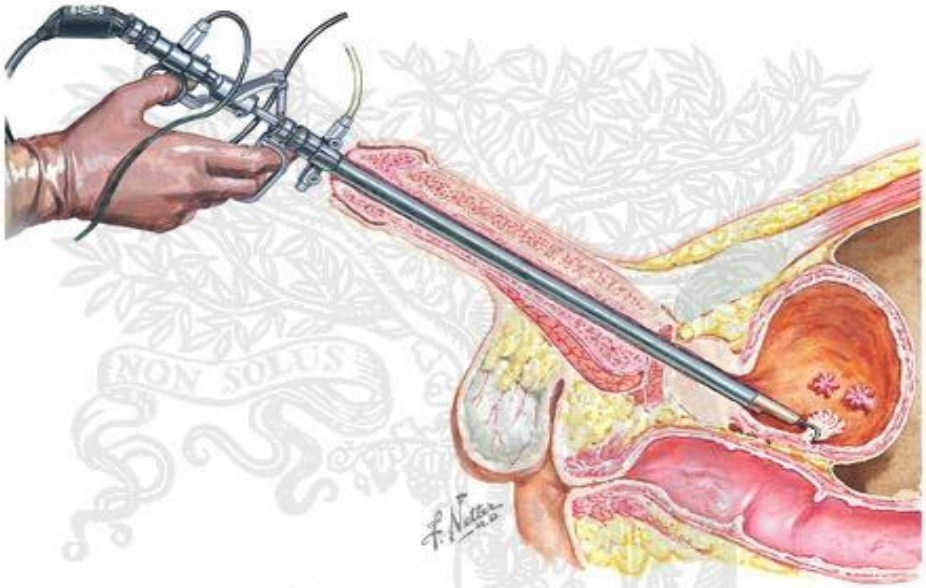
Imaging

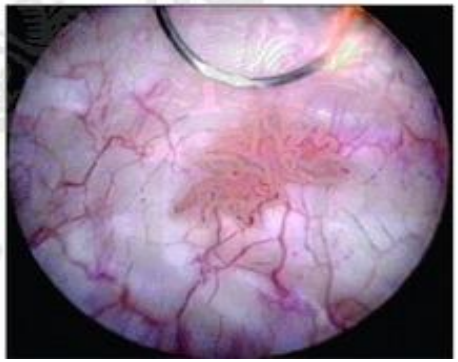
- (PET) CT scans have been utilized to assess metastases from bladder cancer.
- Early data suggests that PET CT may be able to detect microscopic metastases in lymph nodes that otherwise appear normal with a sensitivity of 70% and specificity of 94%.

Cystourethroscopy and Tumor Resection

- Transurethral resection (TUR) - diagnosis and initial staging of bladder cancer.
- Superficial, low-grade tumors - usually single or multiple papillary lesions. Higher grade lesions are larger and sessile.
- CIS may appear as flat areas of erythema and mucosal irregularity.

Cystourethroscopy and Tumor Resection

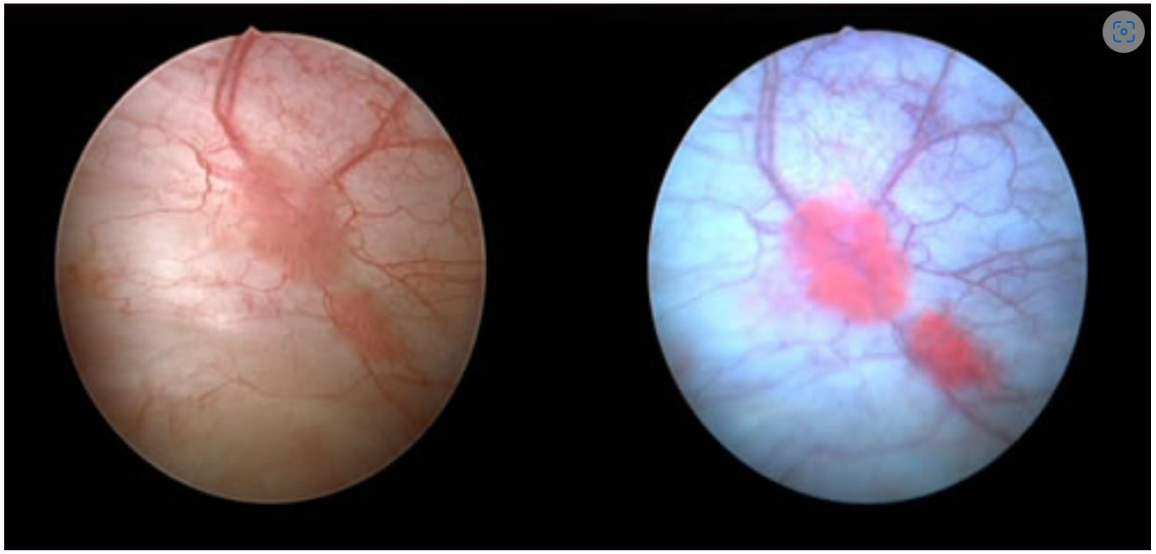




Cystourethroscopy and Tumor Resection

- Use of fluorescent cystoscopy with blue light can enhance the ability to detect lesions by as much as 20% .
- This technology can be particularly useful in the detection of CIS.

On the left is a view of the bladder in white light; on the right is the same view but with blue light, which shows tumors



Cysview is an FDA approved optical imaging agent.

Transurethral resection of bladder tumor(TURBT)

- Diagnosis,
- Degree of bladder wall invasion(staging),
- Complete excision of the low-stage lesions

The AUA' best practice guidelines for bladder cancer

"all patients undergo as complete a resection as possible of all visible tumors."

Natural History and Selection of Treatment

- 74% - superficial or non-muscle invasive (stage Tis, Ta, or T1).
- 26% - Invasion into the muscle wall and beyond.

80% of patients with invasive or metastatic disease have no previous history of bladder cancer.

Natural History and Selection of Treatment

- Low-stage, low-grade disease: low risk (<5%) of progression to invasive disease.
- 40% of patients with low-stage but high-grade disease will progress with extended follow-up.

Facts of Superficial TCC

- Recurrence rate: 70-88% (Ta & T1)
- Progression rate:Ta (<6%), T1 (29-39%)
  - T1G1-2: 5-8%
  - T1G3 (10% of superficial TCC): 50% progression
-

	Survival rate (5-year)	LN metastases
– Ta & T1:	81%	5%
– T2:	53%	10-30%
– T3:	39%	31-35%
– T4:	25%	35-64%

Natural History and Selection of Treatment

- Lymph node metastases: (5%) in tumors of low stage, they are increasingly more common in higher stage tumors:
- 10–30% for pT3A, 31–46% for pT3B, and 35–64% for pT4.

Natural History and Selection of Treatment

Progression:

- 5% in low-grade tumors,
- 15–40% with high-grade tumors,
- PUNLMPs no risk of progression

Natural History and Selection of Treatment

- Recurrence

history of disease and grade, number, and size of the tumor.

Patients with T1, multiple (>4), large (>3 cm), or high-grade tumors are at greater risk..

- It is more common in the first 12–24 months after diagnosis (but can become manifest many years later).
- patients with one recurrence are more likely to have another.

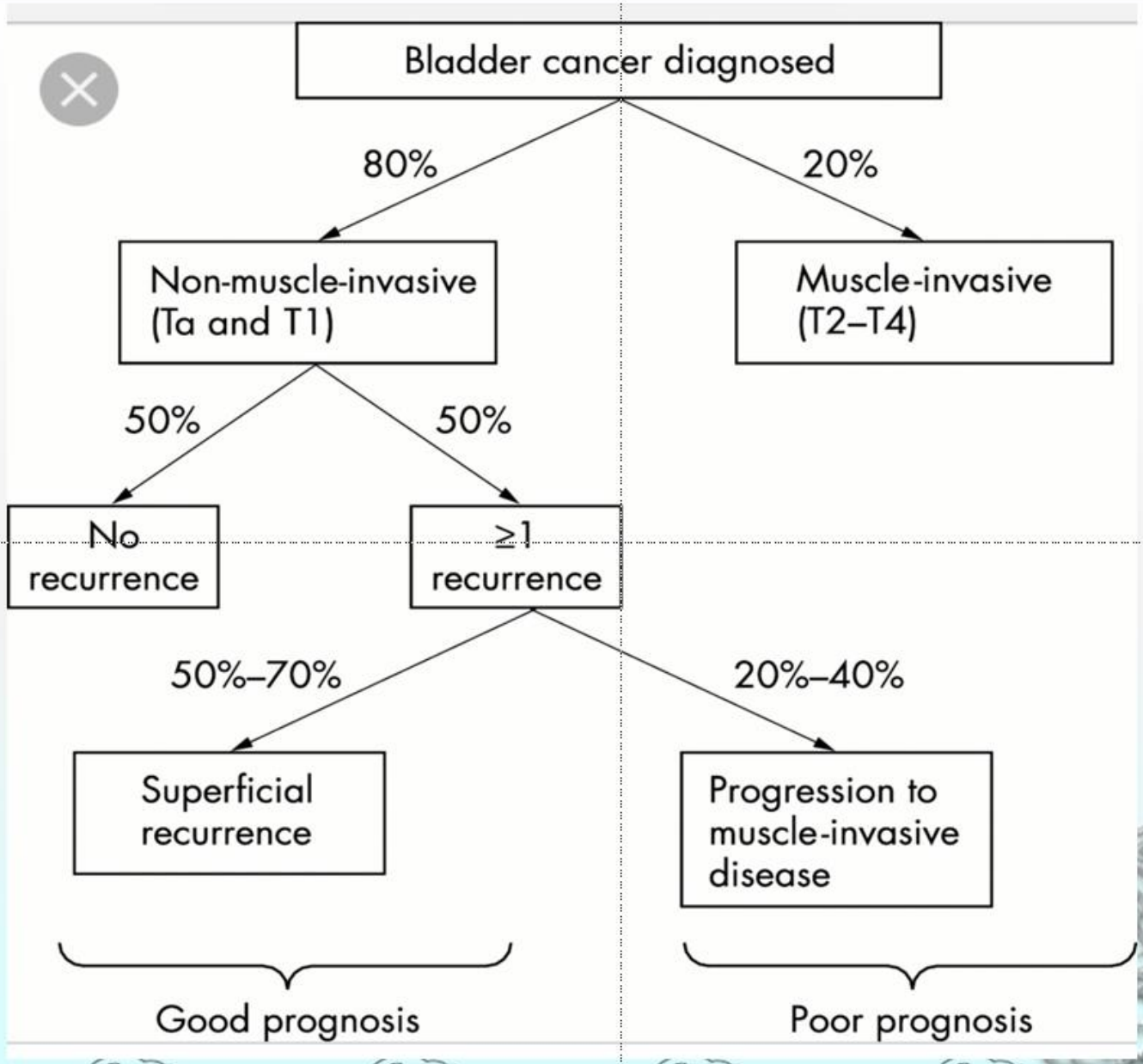
Molecular Markers

- Patients with altered p53 expression: increased risk for disease recurrence and a decreased overall survival.
- retinoblastoma (Rb) gene, a tumor suppressor gene, Rb alteration appears to be significantly associated with decreased overall survival.

Table 21–2. Initial treatment options for bladder cancers.

Cancer stage	Initial treatment options
Tis	Complete TUR followed by intravesical BCG
Ta (single, low-to-moderate grade, not recurrent)	Complete TUR
Ta (large, multiple, high grade, or recurrent)	Complete TUR followed by intravesical chemo- or immunotherapy
T1	Complete TUR followed by intravesical chemo- or immunotherapy or radical cystectomy
T2–T4	Radical cystectomy Neoadjuvant chemotherapy followed by radical cystectomy Radical cystectomy followed by adjuvant chemotherapy Concomitant chemotherapy and irradiation
Any T, N+, M+	Systemic chemotherapy followed by selective surgery or irradiation

TUR, transurethral resection.


Bladder cancer diagnosed
80%
20%
Non-muscle-invasive (Ta and T1)
Muscle-invasive (T2–T4)
50%
50%
No recurrence
≥1 recurrence
50%–70%
20%–40%
Superficial recurrence
Progression to muscle-invasive disease
Good prognosis
Poor prognosis

Treatment Selection

- Superficial bladder cancers :TUR followed by selective intravesical chemotherapy or immunotherapy.
- Initial low-grade small tumors, low risk of progression: TUR alone followed by surveillance or intravesical chemotherapy.

T1

- T1, high-grade, multiple, large, recurrent tumors or those associated with CIS on bladder biopsies: intravesical chemotherapy or immunotherapy after complete and careful TUR.
- Recurrence of T1 disease after a trial of intravesical therapy warrants more aggressive therapy such as cystectomy.

T2,T3

- More invasive, but still localized, tumors (T2, T3) : partial or radical cystectomy, or a combination of radiation and systemic chemotherapy.
- Radical TUR alone may be a viable option in select patients with T2 disease, particularly if no tumor is found on repeat resection.

T4B

- Unresectable local tumors (T4B): systemic chemotherapy, followed by surgery (or possibly irradiation).

.

Reasons for Intravesical Therapy

- High recurrence rate post TUR-BT (80% within 1 year) (prophylactic)
  - Multiplicity
  - Seeding of tumor cells on damaged urothelial surface (adjunctive)
  - Related to cancer stage, grade, number, associated dysplasia, and DNA content
- Unresectability of tumors (therapeutic)

Table 23–3. Delivery of intravesical chemotherapy or immunotherapy.

Use	Timing	Goal
Adjunctive	At TUR	Prevent implantation
Prophylactic	After complete TUR	Prevent or delay recurrence or progression
Therapeutic	After incomplete TUR	Cure residual disease

TUR, transurethral resection.

Intravesical Chemotherapy

- The most common agents: mitomycin C, thiotepa, and Bacillus Calmette-Guérin (BCG).
- Patients in whom treatment with one agent fails may respond to another.

Indications for Intravesical Therapy

- Multiple, diffuse papillary tumors
- Large tumor (>2 cm) at initial presentation
- Tumor recurrence within one year of treatment
- TaG3
- Any T1 tumor (T1G3?)
- Presence of CIS
- Positive urine cytology after resection of visible tumor

Intravesical Therapy

Drug	MW	Dose	Response rate	Side effects
Mitomycin C	329	30 mg	33-60%	irritative, skin rash (6%)
Thiotepa	189	30 mg	55%	myelosuppression (9%) FDA approved
Doxorubicin	580	30 mg	38-60%	cystitis
Valrubicin	-	800 mg	15-18%	BCG-refractory CIS
BCG	-	100 mg	73-89%	cystitis

BCG

- The exact mechanism: unknown, immune modulatin
- BCG: be effective both therapeutically and prophylactically.
- Most efficacious intravesical agent for the management of CIS.
- Complete responses are recorded in 36–71% of patients with residual carcinoma.
- Recurrence rates are reduced substantially in patients treated after endoscopic resection (11–27% versus a 70% recurrence after endoscopic resection alone).

BCG

- Side effects: 7% of patients: frequency, urgency and Hemorrhagic cystitis.
- <2% distant infection.
- Mild systemic or moderate local symptoms should be treated with isoniazid (300 mg daily) and pyridoxine (vita-min B6 50 mg/day), and the dosage of BCG should be reduced.

BCG

- Severe systemic symptoms: prolonged high fever (>103°F), symptomatic granulomatous prostatitis, or evidence of systemic infection ------isoniazid and rifampin (600 mg daily).
- BCG sepsis (eg, high fever, chills, confusion, hypotension, respiratory failure, jaundice) ----- isoniazid, rifampin, and ethambutol (1200 mg).

Transurethral resection of bladder tumor (TURBT)

- TUR -diagnosis, staging and grade
- Single, low-grade, non-invasive tumors--TUR alone;
- Superficial disease but high-risk--TUR followed by selective use of intravesical therapy.

Partial cystectomy

- Solitary, infiltrating tumors (T1–T3) localized posterior lateral wall or dome and cancers in a diverticulum.
- Partial cystectomy is uncommonly indicated in the management of invasive bladder cancer.

Radical cystectomy

- Removal of the anterior pelvic organs:

in men: bladder with its surrounding fat,
peritoneal attachments,
prostate, and the seminal vesicles;

in women: bladder and surrounding fat,
peritoneal attachments,
cervix, uterus, anterior vaginal vault,
urethra, and ovaries.

- This remains the "gold standard" of treatment for patients with muscle invasive bladder cancer.

Radical cystectomy

Disease-free survival 5 years after surgery

- 88% for PT0, PTa, or PTIS
- 80% for PT1
- 81% for PT2
- 68% for PT3a
- 47% for PT3b
- 44% for PT4a

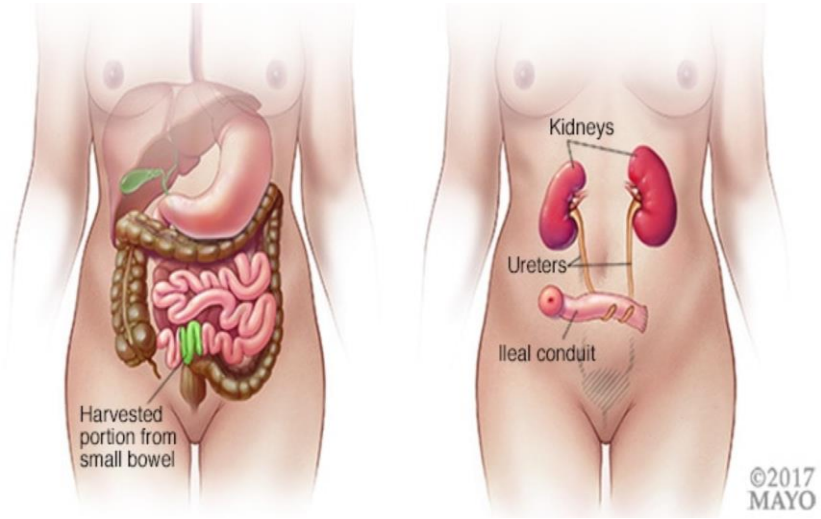
Recurrences after surgery usually occur within the first 3 years.

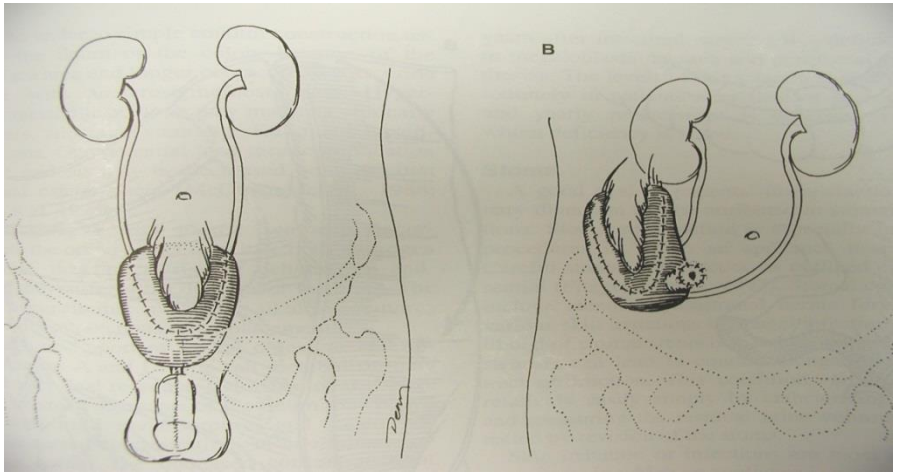
- Local pelvic recurrence rates (7–10%)
- Most patients who fail therapy have distant disease recurrence

Radical cystectomy

- A bilateral pelvic lymph node dissection is usually performed simultaneously with radical cystectomy.
- Lymph node metastases are identified in approximately 20–35% of patients.
- patients (10–33%) with limited disease in regional lymph nodes may be cured by radical cystectomy and lymphadenectomy.

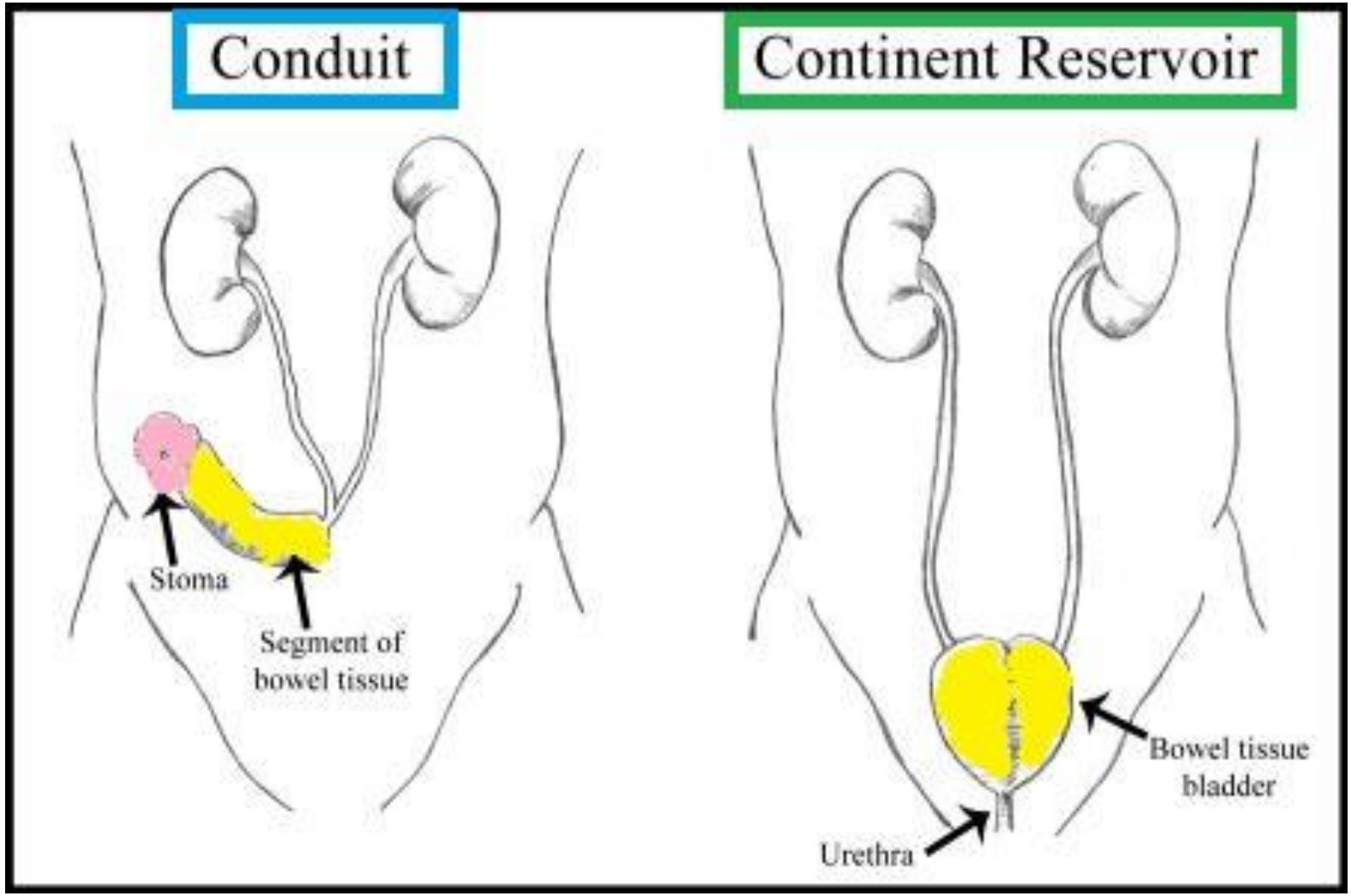
Ileal conduit and neobladder





- **Ureterocutaneostomy, ureterosigmoidostomy, ileal conduit, continent cutaneous pouch formations and neobladder substutitions using intestinal segments are main types of urinary diversions.**

Ileal conduit and neobladder



Radiotherapy

- An alternative to radical cystectomy in well-selected patients with deeply infiltrating bladder cancers.
- 15% of patients may have significant bowel, bladder, or rectal complications.
- Five-year survival rates: stages T2 and T3 disease: 18% to 41% , local recurrence: 33–68%
- radiation as monotherapy: poor surgical candidates (advanced age or significant comorbid medical problems).

Chemotherapy

- The single most active agent : cisplatin, Other effective agents include methotrexate, doxorubicin, vinblastine, cyclophosphamide, gemcitabine, and 5-fluorouracil. .
- The regimen of methotrexate, vinblastine,doxorubicin (Adriamycin), and cisplatin (MVAC).

MVAC

- 13–35% of patients receiving such regimens attain a complete response. Treatment with MVAC is associated with substantial toxicity, including a toxic death rate of 3–4%.
- The advantage of gemcitabine and cisplatin over MVAC is significantly lower toxicity and improved tolerability.

Combination Therapy

- Chemotherapy can be given before planned radical cystectomy (neoadjuvant) in an attempt to decrease recurrence rates and, in selected cases, allow for bladder preservation.
- 22–43% of patients achieve a complete response to chemotherapy alone.

- Results from a recent randomized trial suggest that neoadjuvant chemotherapy followed by surgery improve duration of survival when compared with surgery alone for patients with invasive disease.

Adjuvant chemotherapy

- Adjuvant chemotherapy may be offered to selected patients after radical cystectomy because of an increased risk of recurrence due to the presence of locally advanced disease (ie, P3, P4, or N+).

chemoradiation

- Treated patients with invasive bladder cancer with complete TUR followed by concomitant chemotherapy and radiation
- Complete response rates to chemoradiation may be as high as 50–70% initially, with 5-year overall survival rates approaching 50–60%. However, local recurrence is common, exceeding 50% in many of these studies.

Bladder cancer: Stage and Prognosis

Stage	TNM		5-y. Survival
0	Ta/Tis	NoMo	>85%
I	T1	NoMo	65-75%
II	T2a-b	NoMo	57%
III	T3a-4a	NoMo	31%
IV	T4b	NoMo	24%
	each T	N+Mo	14%
	each T	M+	med. 6-9 Mo

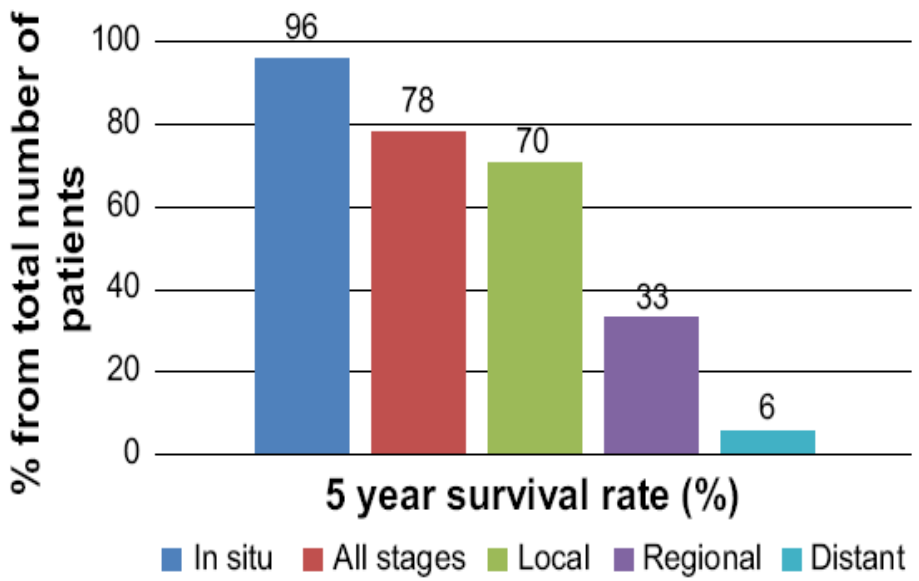


Figure 1 Five-year relative survival rates for bladder cancer in relation to the stage at time of diagnosis.

URETERAL AND RENAL PELVIC CANCERS

- 4% of all urothelial cancers. The ratio of bladder– renal pelvic–ureteral carcinomas: 51:3:1.
- The mean age at diagnosis is 65 years, and the male–female ratio is 2–4:1.
- Patients with a single upper tract carcinoma are at risk of developing bladder carcinomas (30–50%) and contralateral upper-tract carcinoma (2–4%).

Etiology

- Smoking and exposure to certain industrial dyes or solvents
- A long history of excessive analgesic intake,
- All the major constituents of the analgesic compounds consumed (acetaminophen, aspirin, caffeine, and phenacetin) may be associated with an increased risk of upper urinary tract cancer.
- Balkan nephropathy: interstitial inflammatory disease of the kidneys that affects Yugoslavians, Rumanians, Bulgarians, and Greeks; associated upper-tract carcinomas are generally superficial and more likely to be bilateral.

Pathology

- Transitional cell epithelium.
- Grading is similar to that for bladder carcinomas.
- Papillomas account for approximately 15–20% of cases.
- Carcinomas of the ureter, 50% multicentricity .
- There is a relationship between tumor grade and the likelihood of urothelial abnormalities elsewhere.
- Most common metastatic sites include regional lymph nodes, bone, and lung.

- Squamous carcinomas: 10% of renal pelvic cancers. Chronic inflammation from infection or calculous disease.
- Adenocarcinomas: very rare tumors of the upper urinary tract and, far advanced at the time of diagnosis.

Fibroepithelial polyps

- Fibroepithelial polyps occur most commonly in young adults and are characterized radiographically by a long, slender, and polyploid filling defect within the collecting system.

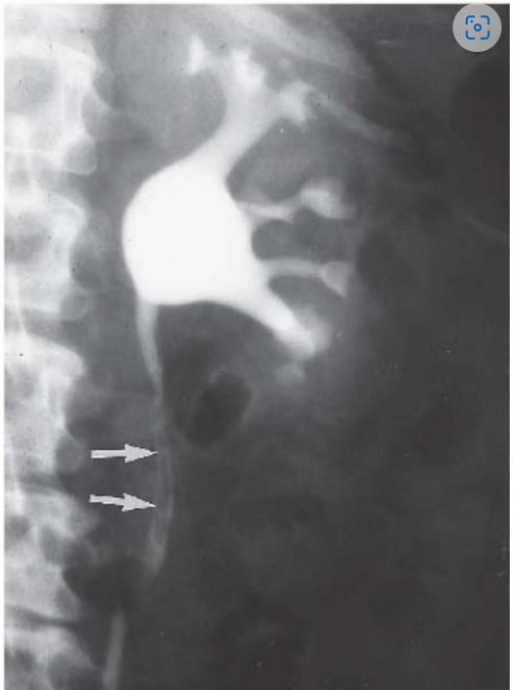


Table 21–4. Staging of ureteral and renal pelvic carcinoma.

	TNM†
Confined to mucosa	Ta, Tis
Invasion of lamina propria	T1
Invasion of muscularis	T2
Extension through muscularis into fat or renal parenchyma	T3
Spread to adjacent organs	T4
Lymph node metastases	N+
Metastases	M+

†Tumor, Node, Metastasis.

Drawn from American Joint Committee on Cancer, 1997.

Staging and Natural History (UTUC)

- Staging of UTUC parallels the staging system developed for bladder cancer.
- Tumor stage and grade correlate with survival
- 40% and 75% of T2–T4 have regional or distant metastases respectively.
- Upper urinary tract cancers: 40% recurrent bladder cancer.

Symptoms and Signs

- Gross hematuria: in 70–90%
- Flank pain, 8–50%, is the result of ureteral obstruction (bood clots or tumor fragments, renal pelvic or ureteral obstruction by the tumor itself, or regional invasion by the tumor).
- Irritative voiding symptoms, 5–10%.
- Constitutional symptoms of anorexia, weight loss, and lethargy are uncommon and are usually associated with metastatic disease.
- A flank mass owing to hydronephrosis or a large tumor,10–20%
- Supraclavicular or inguinal adenopathy or hepatomegaly : metastatic disease.

Laboratory Findings

- Hematuria
- Pyuria and bacteriuria : obstruction and urinary stasis.
- Cytology, specimens may be obtained directly with a ureteral catheter. 20–30% of low-grade cancers may be detected by cytologic testing compared with >60% of higher grade lesions

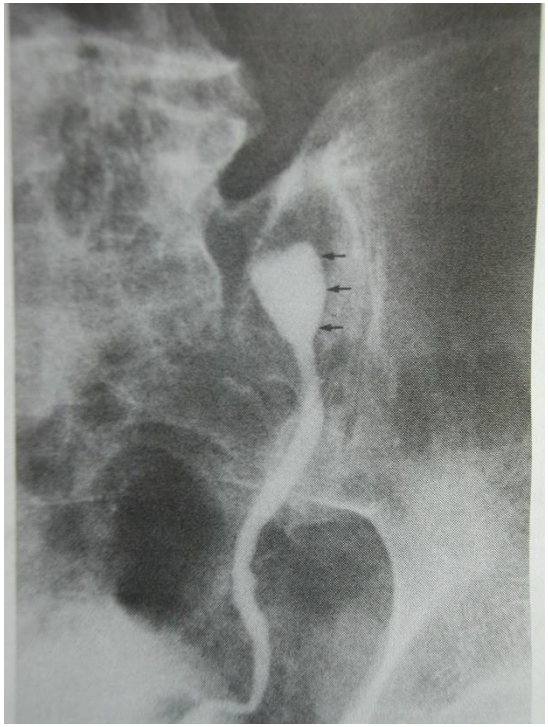
Imaging

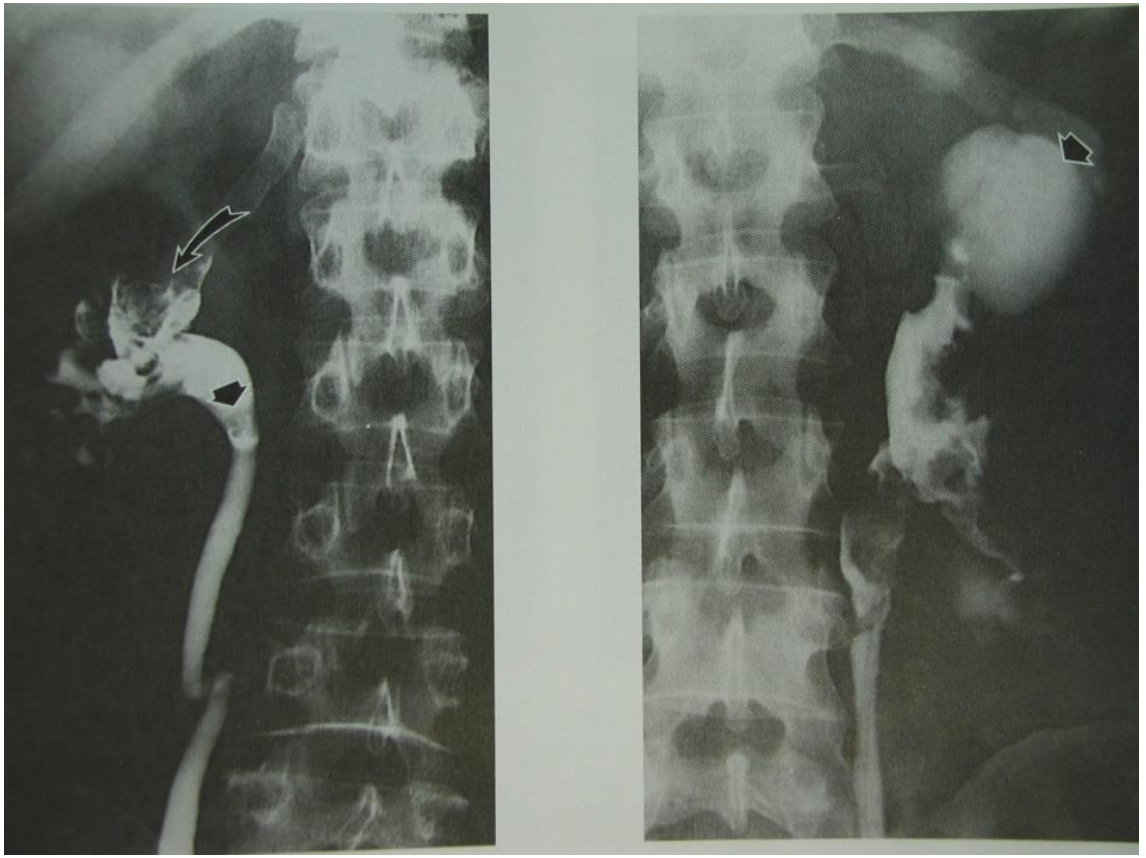
- Intravenous or CT urography: intraluminal filling defect, unilateral non-visualization of the collecting system, and hydronephrosis.
- Must be differentiated from non-opaque calculi, blood clots, papillary necrosis, and inflammatory lesions such as ureteritis cystica, fungus infections, or tuberculosis.

Retrograde pyelography

- Ureteral tumors are often characterized by dilation of the ureter distal to the lesion, creating the appearance of a “goblet.”
- Non-opaque ureteral calculi appear as a narrowing of the ureter distal to the calculus.
- A ureteral catheter passed up the ureter may coil distal to a ureteral tumor (Bergman’s sign).

Retrograde pyelography





Bergman sign - postobstructive dilatation

Goblet sign (ureter)

Dr Brian Gilcrease-Garcia and A.Prof Frank Gaillard et al.

The **goblet sign**, also known as the **champagne glass sign**, refers to the appearance of the ureter when it is focally dilated by an intraluminal mass. It is best seen when the ureter is opacified by retrograde contrast (retrograde ureterogram). Presence of this sign indicates the pathology to be chronic, permitting the lesion to be accommodated in the ureter.

Berg·man sign (bĕrg'măn sīn)

A radiographic finding suggesting a neoplasm in which 1) the ureter is dilated distal to a ureteral obstruction and 2) a catheter, passed retrograde, coils in the dilated ureter.

Synonym(s): **catheter coiling sign**.

Ureteropyeloscopy

- direct visualization of upper urinary tract abnormalities.

Indications for ureteroscopy:

- evaluation of filling defects within the upper urinary tract positive results on cytologic study
- after noting unilateral gross hematuria in the absence of a filling defect.

Ureteropyeloscopy

- Surveillance procedure: conservative surgery for removal of a ureteral or renal pelvic tumor.
- Visualization, biopsy, and, tumor resection, fulguration, or laser vaporization of the tumor
- Biopsies tend to underestimate tumor grade in 22% of patients and stage in 45% of Ta tumors .

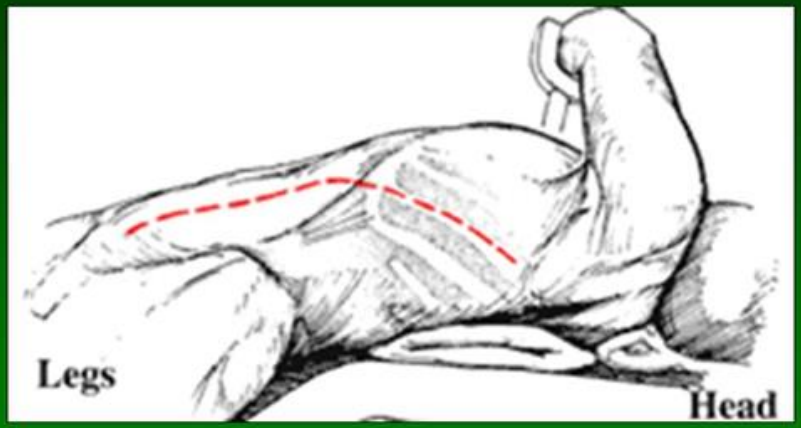
Treatment

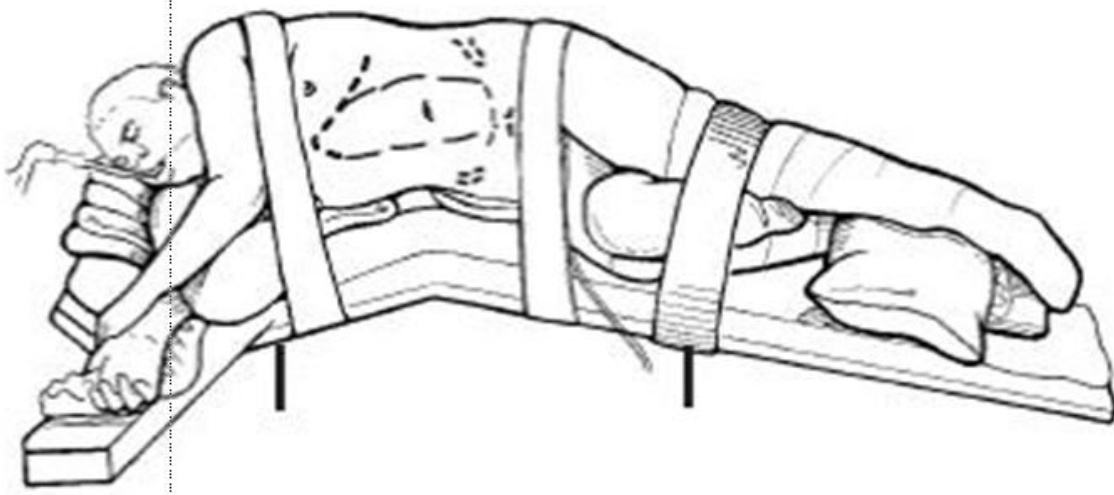
- The standard therapy for UTUC: nephroureterectomy with excision of a bladder cuff (possibility of multifocal disease within the ipsilateral collecting system).

Absolute indications for renal-sparing procedures

- single kidney,
- bil. urothelial tumors of the upper urinary tract,
- marginal renal function.

Open Nephroureterectomy





- Endoscopic resection, fulguration, or vaporization is safe in properly selected patients.
- However, recurrences have been noted in 15–80% of patients treated with open or endoscopic excision.
- Recurrence may be avoided by treating with instillation of immunotherapeutic or chemotherapeutic agents such as BCG or mitomycin C.

- If patients are treated conservatively, endoscopic surveillance should be routine follow-up, imaging alone may be inadequate for detecting recurrence.

- Radiotherapy plays a limited role in upper urinary tract cancers.
- Patients with metastatic, transitional cell cancers of the upper urinary tract should receive cisplatin-based chemotherapeutic regimens as described for patients with metastatic bladder cancers.

- neoadjuvant chemotherapy in those with invasive upper tract tumors may be better tolerated and yield higher response rates.
- Adjuvant chemotherapy does not appear to improve survival significantly in patients with upper urinary tract neoplasms.